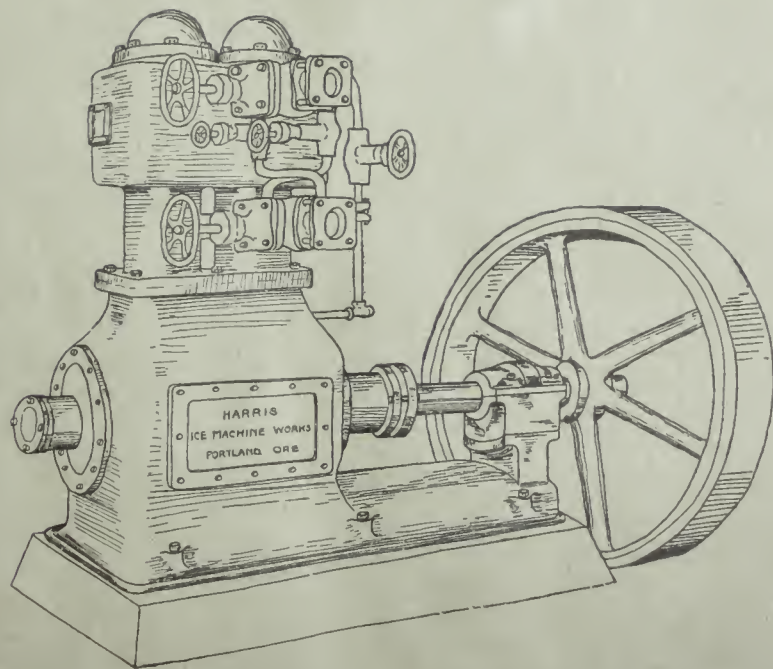


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# HARRIS ICE MACHINES



No. 4

GENERAL CATALOG

1923

H. E. HARRIS, PRESIDENT

MILTON B. HENDERSON, VICE PRESIDENT

GILBERT W. HARRIS, SUPERINTENDENT

ESTABLISHED 1899

INCORPORATED 1913

# THE HARRIS ICE MACHINE WORKS

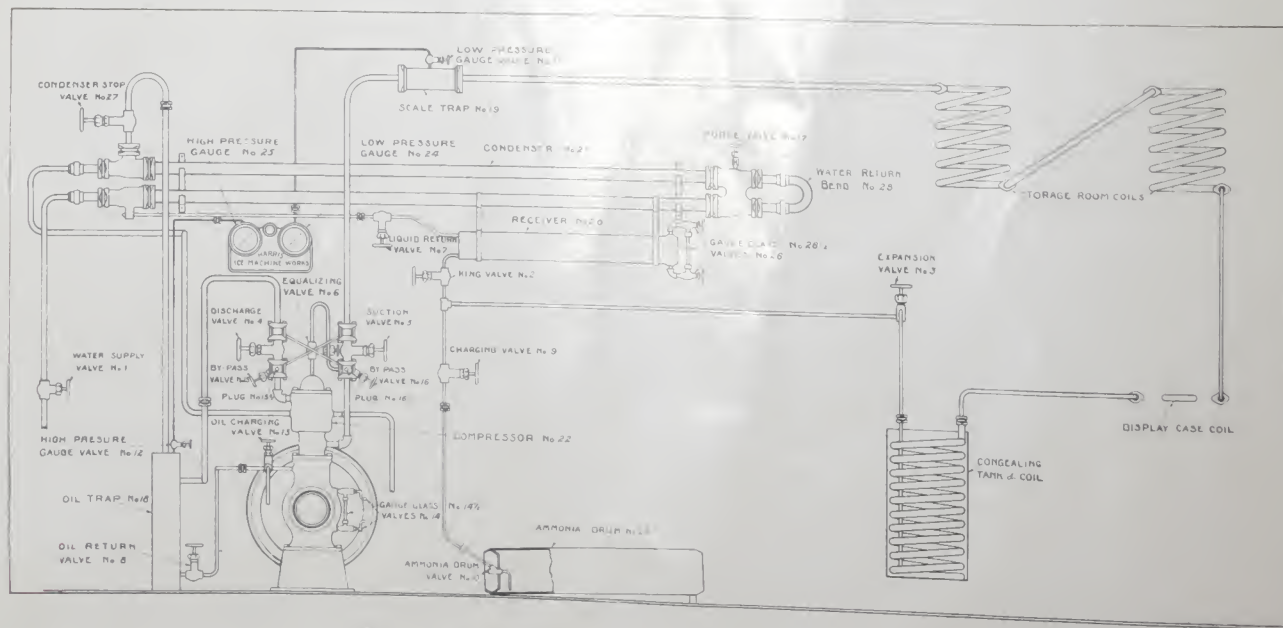
MAIN OFFICE AND WORKS  
172-178 EAST WATER STREET  
PORTLAND, OREGON

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MANUFACTURERS OF

ICE MAKING AND REFRIGERATING MACHINERY

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The above cut illustrates all parts of a refrigerating system. It is the basis of our printed instruction sheet, which we furnish gratis with each plant.



## Foreword

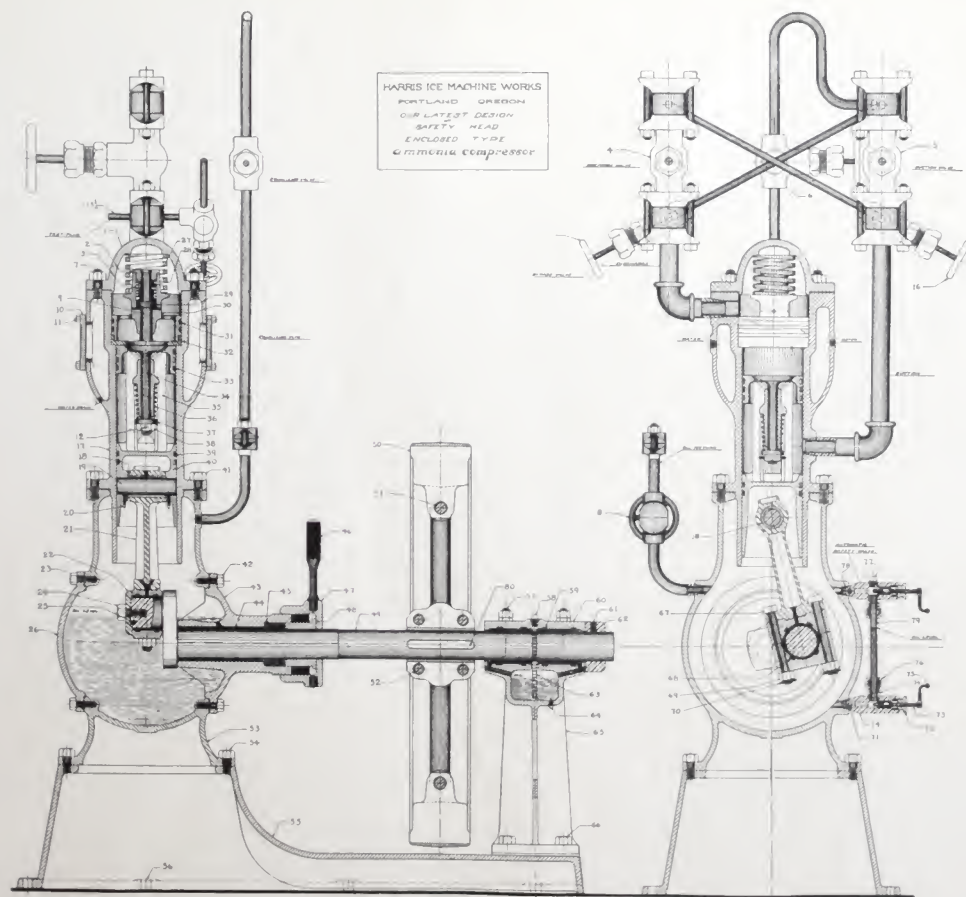


THIS catalog supersedes all previous issues, illustrating and describing our improved type of compressors and accessories.

No radical changes have been found necessary in either the design or construction of our equipment. All changes which our experience has proved advisable have been made, however, and our entire line will be found to conform strictly to the most modern practice.

Our twenty five years of manufacturing experience is always at the disposal of any prospective purchaser of refrigerating equipment.

CAPACITIES, HORSE POWER, WEIGHTS AND MAIN DIMENSIONS OF HARRIS VERTICAL SINGLE ACTING  
ENCLOSED TYPE COMPRESSORS





## THE HARRIS SINGLE ACTING AMMONIA COMPRESSOR

**S**IMPLICITY, RELIABILITY, ACCESSIBILITY AND ECONOMY OF OPERATION are the features most desired in any refrigerating or ice making machine. Those shown herewith have been designed with these ends in view, honestly built in a well equipped shop by skilled mechanics and are sold under an iron-clad guarantee by a responsible firm. We believe a brief description of each part will be of assistance to the intending purchaser, and will enable him to see why our machines fulfill the above requirements as well, if not better, than any others manufactured.

### THE BASE

ONE AND TWO TON TYPE AS SHOWN ON FOLLOWING PAGE

THE BASE is a casting of gray iron, ample in thickness and properly braced to secure rigidity. It is machined on one end for the outboard bearing, on the other for the body of the compressor. No less than seven holes for anchor bolts are provided. As the base is the casting which holds the other parts of the machine in alignment, and upon which the very life of the machine depends, its importance cannot be over-estimated.

### THE OUTBOARD BEARING

THIS CARRIES the outer end of the crankshaft, part of the weight of the flywheel and stands practically all of the pull of the belt. Bearing and cap are also cast of gray iron, and the bearing is rigidly bolted to the base. The best babbit metal is used as a lining and is scraped to an accurate fit on the crankshaft and is self-oiling.



SINGLE CYLINDER COMPRESSOR  
One-half to three-quarter ton type described on page 12

Four studs hold the cap in position, and cap and bearing form a tongue and groove joint, accurately locating the cap in place and providing space for the liners or shims. These may be removed to compensate for wear. The bearing is of the ring oiling type.



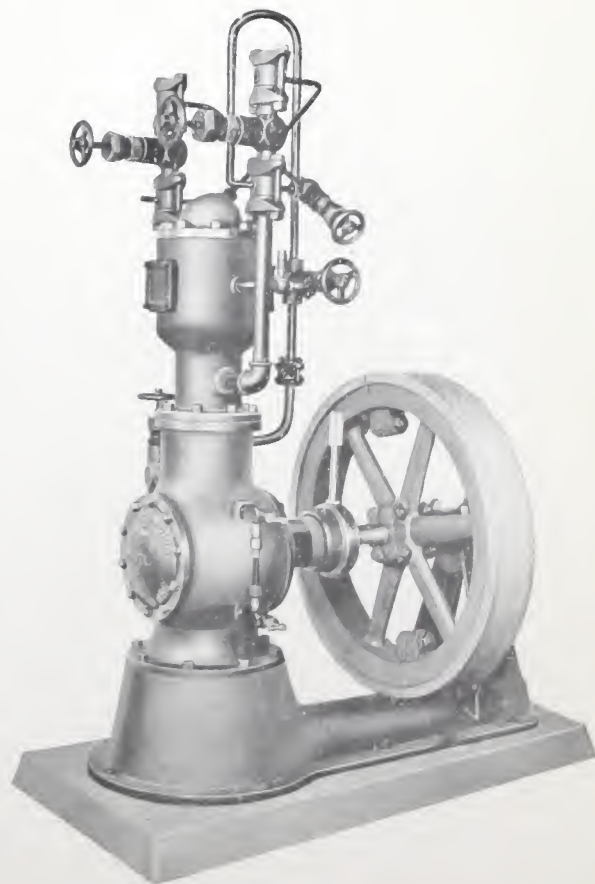
### THE BODY

THIS CASTING is of semi-steel, a mixture of 70 per cent gray iron and 30 per cent steel. This mixture makes a very tough, homogenous metal, expressly suited to stand the pressure of ammonia gas. The body has no flat surfaces, but is spherical in shape, as this form is best adapted to resist pressure. The casting is provided with bosses or lugs into which the necessary pipes and fittings are screwed, and the cylinder, cover and main bearings are bolted to machined faces.

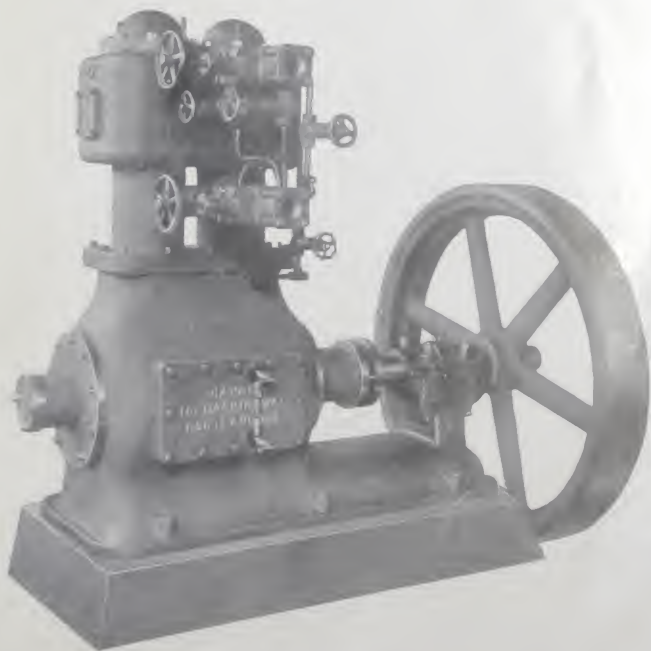
IT MAY BE WELL to now point out one of the leading features of our design. The reader will note that the cylinder, body, base and out-board bearing are all cast separately. This is expensive construction, but was adapted to permit the renewal of any part at small expense. It would be possible to cast the parts mentioned in one piece, thereby greatly cheapening the construction, as we would thus be enabled to build the machines in the foundry. But if a cylinder was scored or a water jacket frozen or cracked, practically a new machine would have to be purchased.

### THE CYLINDER

THIS IS ALSO CAST OF SEMI-STEEL, which is very hard and furnishes a durable wearing surface. The casting embodies the enclosed water jacket, which is provided with two large hand hole plates for cleaning, etc. The enclosed jacket is an excellent feature, as the floor around the machine is kept dry and the location of the sewer is not considered when installing, as water may be forced through the jacket to the top of the building, if necessary.



1 AND 2 TON TYPE COMPRESSOR



FROM 3 TO 30 TON TYPE COMPRESSOR

THE CYLINDER is cast on end, with the head end down. All spongy metal, scale, etc. floats to the top, and three inches of this end of the casting are cut off in machining. An excellent cylinder, free from blow holes and other imperfections, is assured. The bore is finished by reaming which brings it to size within a limit of .001 of an inch, also leaving a very smooth surface. A shoulder is provided near the head end, and the false or safety head is ground into position on this, making a perfect joint.

SUCTION AND DISCHARGE PIPES screw into bosses of large size and both cylinder and body are tested to 300 pounds hydrostatic pressure.

#### THE CRANK SHAFT

THE CRANKSHAFT is forged from a billet of tough steel. The hammering process closes the grain of the metal, and this process, while costly, is recognized the world over as being the most satisfactory. A shaft made from a casting, built up from several pieces, or formed by bending a bar to shape is always troublesome and unsatisfactory.

THE SHAFT is left large in the main bearing, permitting it to be turned down without the necessity of bushing the flywheel and rebabbiting the outboard bearing. All machine work is accurately done, and a plug and ring gauge with a variation limit of .001 of an inch is used in bringing it to size.

## THE GLAND BEARING

THE GLAND BEARING, of semi-steel, is lined with the best babbit. The bearing is unusually long, over three times the diameter of the shaft. The stuffing box is provided with gland and nut, this construction being most satisfactory, as there is no danger of cutting the shaft by having the gland bear unevenly upon the packing. A tongue is provided on the casting, which fits into a recess in the body, thus holding the casting central.

## FLYWHEEL

A CASTING OF GRAY IRON, fitted with splitting cores and split before being machined. A wheel made in this way is as strong as a solid wheel, the joint not being visible, and may be removed and replaced at any time with perfect ease.

The wheel is turned true and balanced and is crowned for a leather belt. All wheels are of ample weight to ensure steady running, and no difficulty is experienced with the belt jerking or sliding off.

## CONNECTING ROD

THE CONNECTING ROD is of the marine type, of cast steel. This casting, as well as the piston, is pickled in sulphuric acid to remove all scale. The upper end is lashed with cast iron, the lower fitted with the usual boxes, lined with the best babbit. Accurately fitted bolts secure the boxes to the rod, and thin metal liners are fitted to compensate for wear. Adjustment for clearance is also provided.

THE CONNECTING ROD is over two and one-half times the length of the stroke, reducing side wear on the cylinder, and by cutting down friction makes the machine more easy running.

## THE PISTON AND SUCTION VALVE

THE PISTON is cast of gray iron, and fitted with five snap rings, three to prevent the leakage of high pressure gas and two below the pin, to prevent leakage of liquor into the base. The latter rings, which are most essential, are found on no other machine. All rings are finished by grinding after being sprung together.

THE PISTON is closed above the pin, and the upper part, which carries the suction valve, is supported on four cast ribs of ample section. These ribs are equal in length to the stroke of the machine plus the suction pipe opening. No matter in what position the piston is in, the area of the suction pipe is not restricted, and the large space within the piston carries enough gas to assure a full charge being taken into the cylinder.

THE CLOSED TOP of the lower part of the piston serves as a receptacle for any dirt or scale that may get past the scale trap. The walls of the piston are carried above this for a short distance and are machined to a feather edge, scraping all dirt from the cylinder walls. No other machine of this type has this feature, which absolutely prevents cutting the lower part of the cylinder, and makes a troublesome screen on the suction pipe unnecessary.



THE DIAMETER OF THE PISTON is not decreased at the wrist pin, and a full length bearing is thereby made possible. The wrist pin, of steel, is securely held by two set screws.

THE SUCTION VALVE is of large diameter and small lift and its stem is made longer than the stroke of the machine, making it impossible for this valve to get into the cylinder, even should the nut come off. The valve itself is machined from the solid, and the tension spring is of high grade crucible spring steel wire.

### THE SAFETY HEAD

THE SAFETY HEAD is a casting of close grained gray iron, which rests on a shoulder, counter bored in the cylinder. A distance of travel sufficient to care for and discharge any liquid that may pass through the cylinder of the compressor is provided for.

THE SAFETY HEAD, which has a lift of from  $1\frac{1}{2}$  inch to  $1\frac{1}{2}$  inches, is held in position by a heavy spiral spring. When the machine is deliberately flooded with liquid, the head may be heard working, otherwise it remains on its seat. Clearance is very small, the piston being set so that on the upper part of its stroke it clears head by less than one sixty-fourth of an inch.

THE DISCHARGE VALVE is of the cup type with seat larger in diameter than the diameter of the cylinder and ground on a counter bored shoulder left in the cylinder. The valve is guided and cushioned by the Safety Head, assuring silent operation and short lift of valve.

THE SPRING HEAD is a most valuable feature, as it is impossible to injure the machine **even by deliberate abuse.**

### IN GENERAL

THE BYPASS is of strong construction and in no way interferes with the removal of the cylinder head and piston. Flanged stay valves are used, with distance pieces between the flanges into which the cross pipes are screwed. The suction and discharge of the machine may be interchanged by the use of this bypass, and any part of the system overhauled.

A plug will be found in the water jacket to drain it in case of a shut down in freezing weather.

A BEVELED RING is furnished with each machine. This is used in replacing the piston should it have been necessary to remove it for any reason. The ring is placed on the shoulder of the cylinder bore, with the beveled side up, and the piston forced through it.

ALL MACHINES are given a conservative rating and will do the work for which they are designed when running at stated speed and pressure. All wearing parts are either adjustable or easily removable and are very easy of access. Due to the long connecting rod, large sized bearings and valves, unrestricted discharge and suction passages and small clearances the machines operate with great efficiency, which means low power bills. The foregoing pages, will, we think, demonstrate their honest design and construction, and consequently their reliability.



KEY LOCK of these small machines, properly specified and installed, will protect your property and your business from the serious consequences of a fire.

and insurance company, and will be a great source of information.

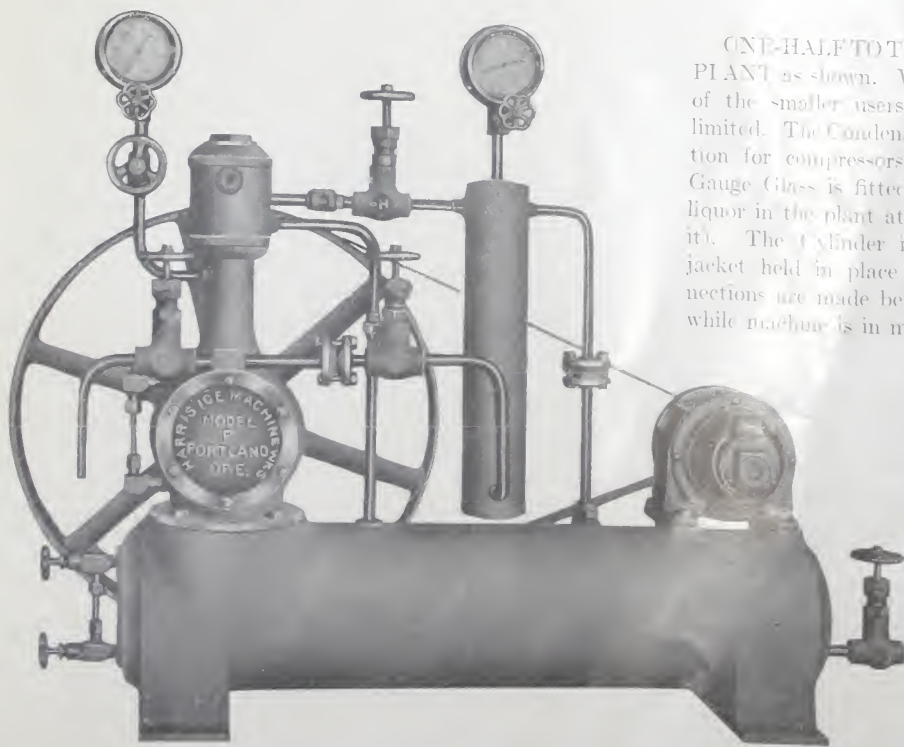
#### PIPE BENDING



We specialize in bending and welding all types of pipe with the necessary fixtures, vee rollers, all rolls, anvil and beams.

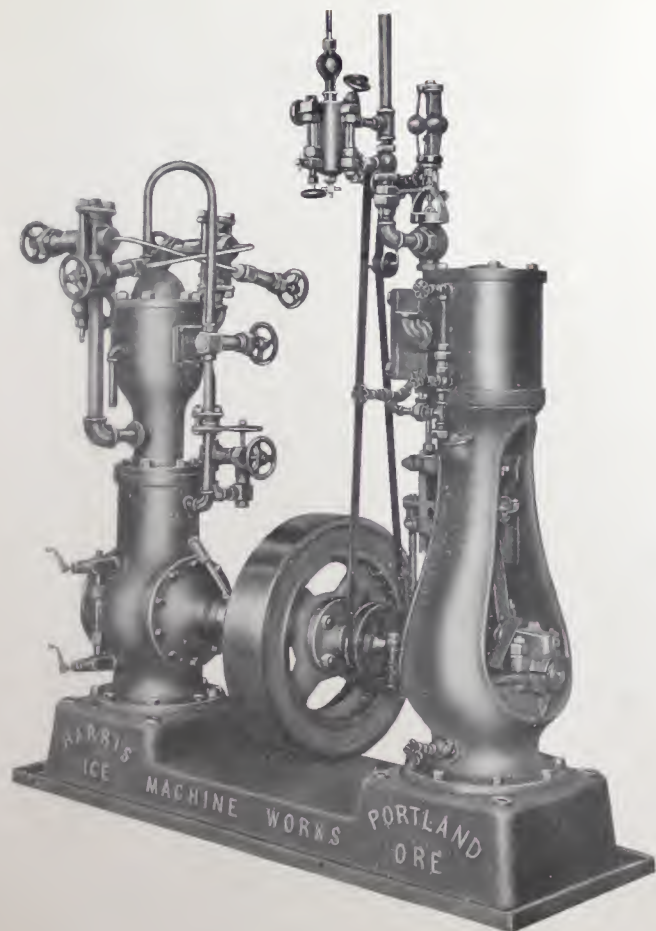
We are especially equipped with special machines for the bending of steel, and can take care of any job quickly and economically.





ONE-HALF TO THREE-QUARTER  
TON UNIT TYPE COMPRESSOR

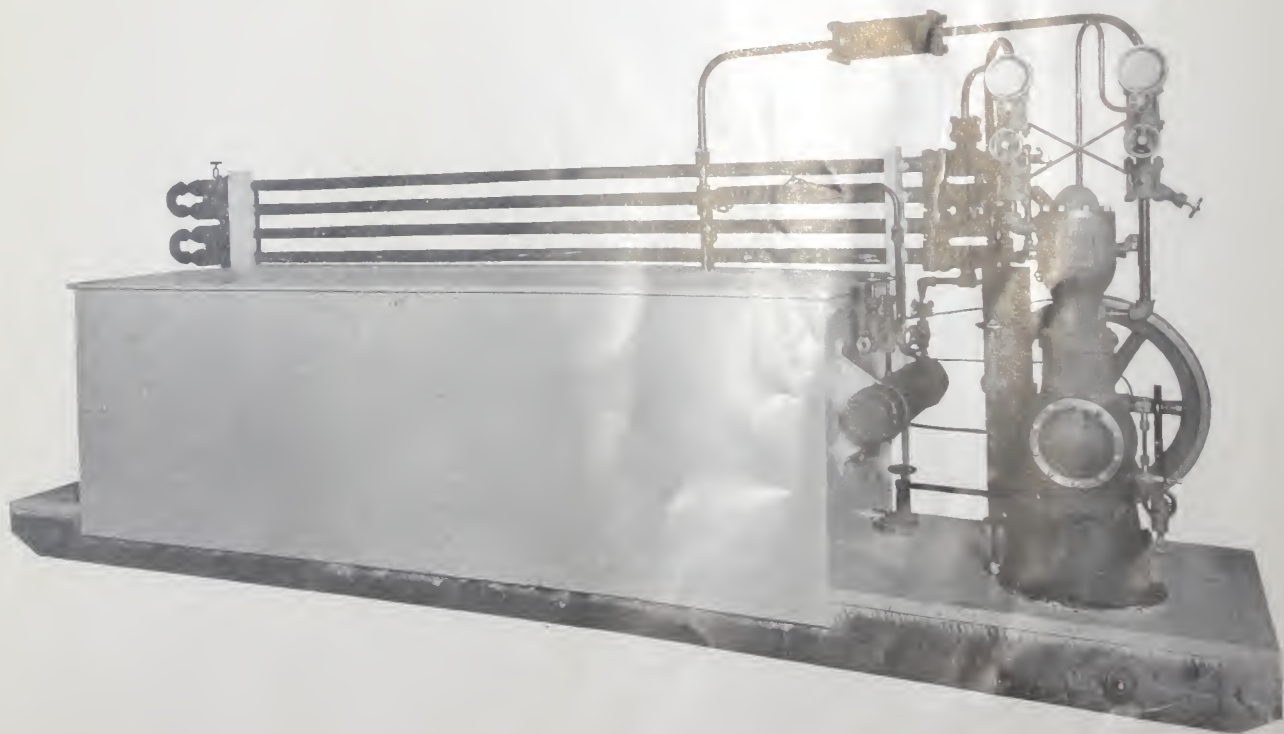
ONE-HALF TO THREE-QUARTER TON UNIT TYPE PLANT as shown. Was designed to meet the requirements of the smaller users of refrigeration and where space is limited. The Condenser and Ammonia Receiver and Foundation for compressors and motor are in combination. A Gauge Glass is fitted to the Receiver to show amount of liquor in the plant at all times (you don't have to guess at it). The Cylinder is provided with a removable water jacket held in place with one cap screw. All pipe connections are made below the jacket which can be removed while machine is in motion. At normal speed of 215 R. P. M. a 1 H. P. motor is provided for one-half ton capacity and at maximum speed of 320 R. P. M. a 1½ H. P. motor is provided for three-quarter ton capacity per 24 hours with Condenser water at 60F. For details of dimension of Compressor refer to first and second items of Compressor Specifications on Page 4 of this Catalog. These machines are thoroughly tested under actual working conditions before shipment. Space required, 66-in. long, 18-in. wide, 56-in. high. Shipping weight, 1125 lbs. This plant will cool a well insulated box of from 1000 to 1500 cubic feet to a temperature of 34F. according to speed of Compressor and temperature of cooling water.



OUR MARINE TYPE MACHINE

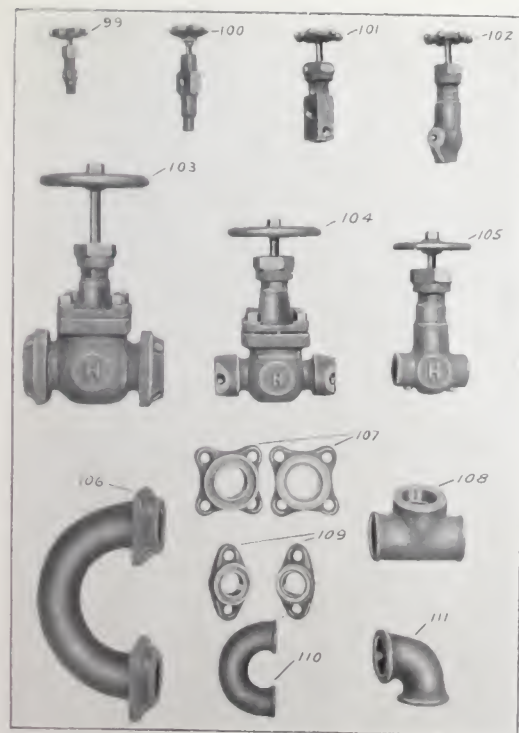
OUR MARINE TYPE COMPRESSOR, direct connected to a steam engine which we designed to meet the requirements of the United States Shipping Board and Lloyds specifications. We have outfitted 40 large steam ships with this unit; also two of the largest dredges operated by the Port of Portland, all of which are giving the best of satisfaction. This type is very desirable for stationary work where steam or compressed air is available. These machines are carried in stock for immediate delivery.





THIS UNIT ICE MAKING PLANT is especially desirable in isolated localities, or where the question of portability is a consideration. We can furnish these plants to manufacture up to 2000 pounds of ice each 24 hours. They can be operated with either an electric motor or a gasoline engine.





**EXTRA HEAVY CAST STEEL AMMONIA VALVES**

No.	Size	DESCRIPTION	List Price
102	1/4-in.	Angle Valve—Screw End	\$ 3 50
105	1/2-in.	Globe Valve—Screw End	5 00
105	1 -in.	Globe Valve—Screw End	6 00
104	1 1/4-in.	Globe Valve—Oval Flanged	16 00
103	1 1/2-in.	Globe Valve—Square Flanged	16 00
103	2 -in.	Globe Valve—Square Flanged	19 00
101	1/2-in.	Forged Angle Expansion Valve	6 00
99	1/2-in.	Angle Purge Valve	4 00
100	1/2-in.	Special Long Body Pressure Gauge Valve	5 00

**AMMONIA FLANGES**

No.	Size of Pipe in Inches	Outside Size of Flange	Center of Bolts	Size of Bolts	No. of Bolts	List Price per Pair with Bolts and Gaskets
109	1/4-in.	3 1/2-in.	2 1/4-in.	1/2-in. x 2 1/4-in.	2	\$ 90
109	3/8-in.	3 3/4-in.	2 3/8-in.	1/2-in. x 2 1/2-in.	2	1 00
109	1/2-in.	3 3/4-in.	2 3/8-in.	1/2-in. x 2 1/2-in.	2	1 20
109	1 -in.	4 1/2-in.	3 1/8-in.	5/8-in. x 3 -in.	2	1 50
109	1 1/4-in.	4 7/8-in.	3 3/8-in.	3/4-in. x 3 1/4-in.	2	1 75
107	1 1/4-in.	3 1/2-in.	2 3/8-in.	3/8-in. x 2 3/8-in.	4	2 25
107	1 1/2-in.	1 -in.	2 3/8-in.	3/8-in. x 3 -in.	4	2 70
107	2 -in.	4 1/2-in.	3 1/8-in.	3/8-in. x 3 1/4-in.	4	3 10

**AMMONIA ELLS—Screw Ends**

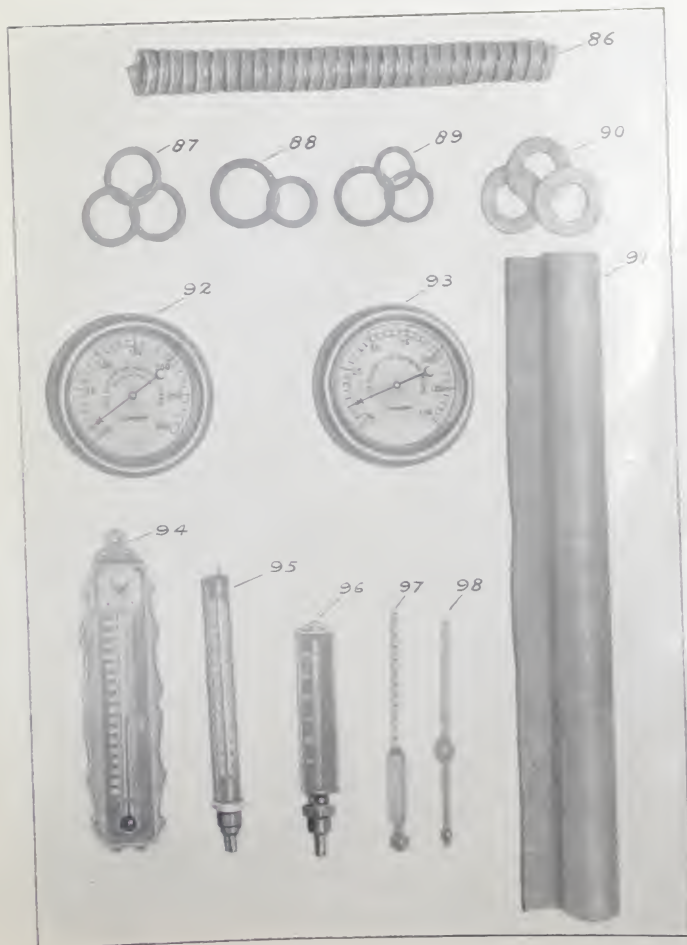
No.	Size in Inches	Center to Face	List Price Each
111	1/2-in.	1 1/8-in.	\$0 30
111	1 -in.	1 1/8-in.	40
111	1 1/4-in.	2 1/8-in.	55
111	1 1/2-in.	2 1/2-in.	70
111	2 -in.	2 7/8-in.	90

**AMMONIA TEES—Screw End**

No.	Size in Inches	Center to Face	List Price Each
108	1/4-in.	1 -in.	\$0 30
108	1/2-in.	1 1/8-in.	45
108	1 -in.	1 1/4-in.	60
108	1 1/4-in.	2 1/8-in.	80
108	1 1/2-in.	2 1/2-in.	1 05
108	2 -in.	2 7/8-in.	1 35

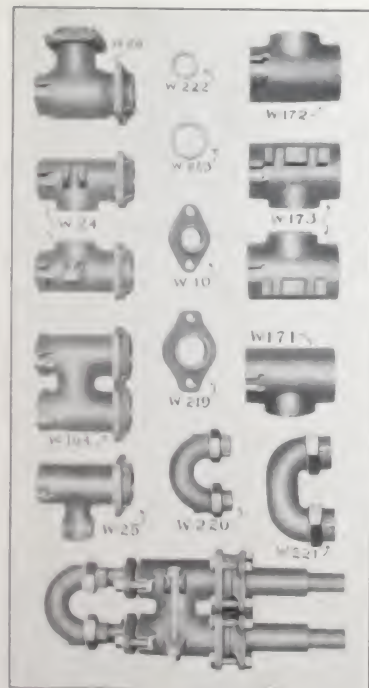
**RETURN BENDS**

No.	SIZE	List Price
110	1 -in. x 3-in. Screw End	\$ .85
110	1 1/4-in. x 4-in. Screw End	1 20
110	1 1/2-in. x 6-in. Screw End	1 75
110	2 -in. x 8-in. Screw End	3 50
106	1 1/4-in. x 4-in. Square Flanged	1 90
106	1 1/2-in. x 6-in. Square Flanged	2 85
106	2 -in. x 8-in. Square Flanged	3 40



# GAUGES, THERMOMETERS, PACKING, ETC.

No.	ITEM	List Price
94	Thermometer—Wall	\$3 00
95	Thermometer—Brine Line	5 00
96	Thermometer—Brine Line	4 00
97	Sds Hydrometer	2 50
98	Calrometer	2 00
92	Ammonia Gauge, 4-in.	24 00
92	Ammonia Gauge, 5 1/2-in.	30 50
93	Ammonia Gauge, 4-in.	24 00
93	Ammonia Gauge, 5 1/2-in.	30 50
86	Ammonia Ring Packing, per lb.	2 00
87	Lead Ring Gasket, each	16
88	Rubber Ring Gasket, 1 1/4-in., each	16
88	Rubber Ring Gasket, 2-in., each	20
89	Rubber Ring Assorted Sizes, each	10
90	Packing Rings, Assorted Sizes, each	10
91	Sheet Packing, per lb.	1 00



CONDENSER FITTINGS

CONDENSER FITTINGS

W-26 Gas inlet or top fitting  
W-24 Split center fitting  
W-164 Solid center fitting  
W-25 Liquid outlet  
W-10 Gland  
W-220 Water return bend  
W-222 1 1/2 in. rubber ring

BRINE COOLER FITTINGS

W-172 Top fitting  
W-173 Center fitting  
W-171 Bottom fitting  
W-219 Gland  
W-221 Brine return bend  
W-223 2 in. rubber ring

The Condensers are of our double pipe style 1 1/4 in. and 2 in. selected ammonia pipe, spaced 4 3/8 in. centers. Condensers and brine coolers are assembled and tested to 300 pounds air pressure before shipment.

CONDENSER FITTINGS

1 1/4 in. and 2 in. pipe, 4 3/8 in. centers

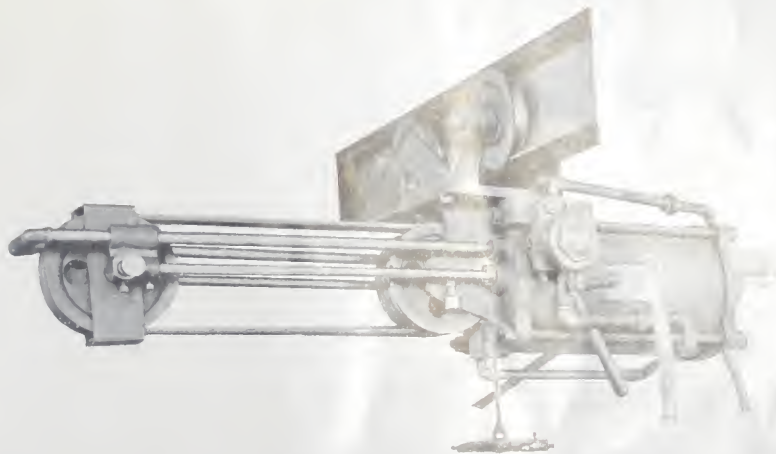
No.	ITEM	List Price
W-26	Gas inlet or top fitting, as per cut	\$4.13
W-25	Liquid outlet, or bottom fitting, as per cut	3.55
W-24	Split center fitting (2 pcs) as per cut	9.10
W-164	Solid center fitting (1 pc) as per cut	6.50
W-220	Water return bend 1 1/4 in. & 4 3/8 in. as per cut	1.60
W-10	Condenser gland, as per cut	.84
W-222	Rubber packing ring, as per cut	.16
	4 pipe bottom section condenser stand complete with bolts and straps	2.67
	4 pipe top section condenser stand, complete with bolts and straps	2.25

BRINE COOLER FITTINGS

2 in. and 3 in. pipe, 9 in. centers

No.	ITEM	List Price
W-172	Top fitting, as per cut	\$ 8.34
W-171	Bottom fitting, as per cut	8.34
W-173	Split center fitting, as per cut, (2 pcs)	12.00
W-221	Brine return bend 3/4 lip union, 9 in. centers, as per cut	2.21
W-219	Packing gland, as per cut	1.20
W-223	2 inch rubber packing ring, as per cut	.20
	4 pipe bottom section brine cooler stand, complete with bolts and straps	4.42
	4 pipe top section brine cooler stand, complete with bolts and straps	3.46





PNEUMATIC HOIST

List Price

For 200, 300 and 400 pound 8 inch single lift \$250.00

For 300 and 400 pound 10 inch double lift 300.00



HAND HOIST

List Price

No. 1 for 200 lb. ice cans \$100.00

No. 2 for 300 lb. " " 125.00



RUNNING GEAR

List Price

For 5 and 8 inch eye beam using 12 lb. crane rail \$125.00





DOUBLE PIPE BRINE COOLERS CONDENSERS AND STANDS

The acme of perfection is reached in the Harris Double Pipe Calcium Brine Cooler and Condenser.

The counter current principal of these Coolers and Condensers, insures the maximum capacity and efficiency under most extreme operating conditions.

The fittings are of cast steel, and are so designed that any pipe may readily be removed without disturbing the balance of piping.

The Brine Coolers are made of 2 inch and 3 inch selected ammonia pipe and made ready for use in any size.



COLD STORAGE DOOR

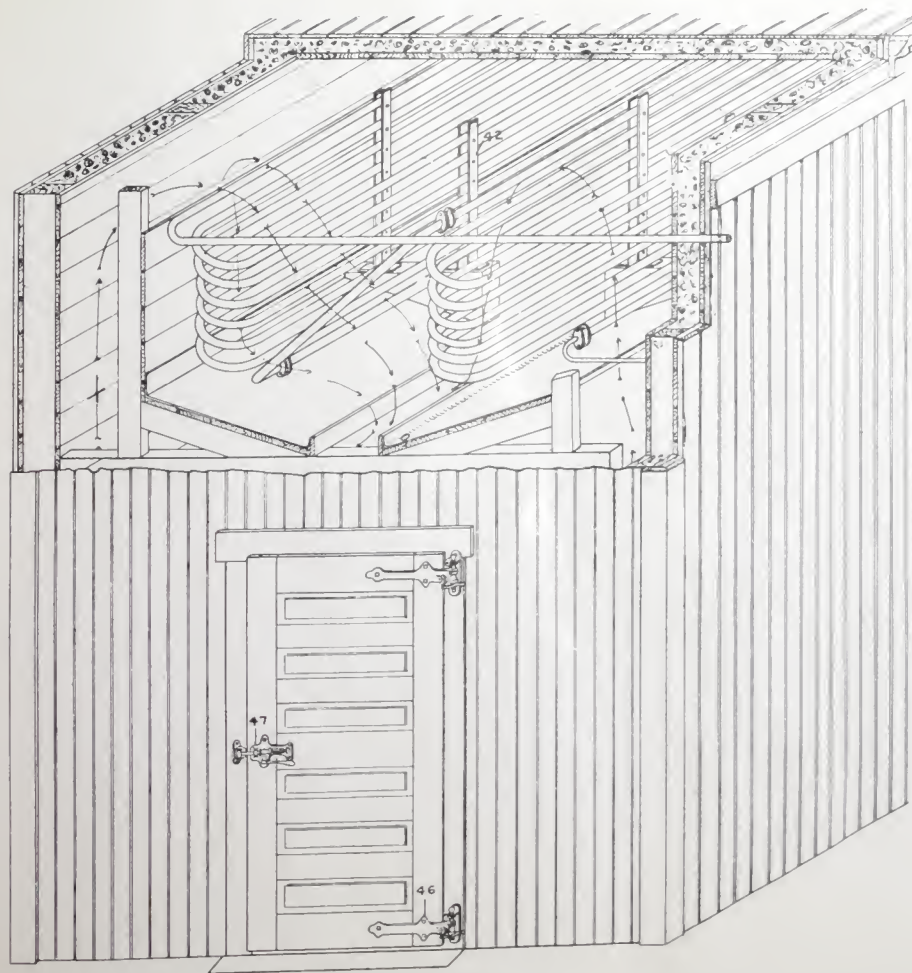
We take great pride in our cold storage door, a cut of which is shown on this page. The door and casing are of selected spruce, the threshold of oak. The door is insulated with the best quality of live cork and provided with two sets of gaskets, rendering it perfectly tight. All the hardware is of cast steel, and is unbreakable. The cut clearly shows the design of the hinges. When the door is opened it rises slightly; the bottom gasket is preserved, and the door does not drag.

The lisp is simple and effective, and the door may be opened from the inside. The door presents a very neat appearance, and the hardware is finished in aluminum paint. Nickel-plated hardware may be had at a slight extra cost. We carry the sizes most used in stock, and can furnish any size on short notice. In ordering, give dimensions and specify whether a right or left hand door is wanted.

Opening in Clear		Leave Opening in Wall	
Wide	High	Wide	High
24"	6' 0"	32"	6' 6"
24"	6' 6"	32"	7' 0"
30"	6' 0"	38"	6' 6"
30"	6' 6"	38"	7' 0"
36"	6' 0"	44"	6' 6"
36"	6' 6"	44"	7' 0"
40"	6' 0"	48"	6' 6"
40"	6' 6"	48"	7' 0"

Our Beef Track doors are of standard design and are fitted with an automatic trap door for track.

	Opening in Clear	Leave Opening in Wall
Quarters	42 $\frac{1}{4}$ "x7'-9 $\frac{1}{4}$ "	43 $\frac{1}{4}$ "x7'-10 $\frac{1}{2}$ "
Halves	42 $\frac{1}{4}$ "x11'-3 $\frac{1}{4}$ "	43 $\frac{1}{4}$ "x11'-4 $\frac{1}{2}$ "



### INSULATED ROOMS

Our files are complete with specifications and drawings for buildings, rooms and boxes of any desired insulation and arrangement. We use the best materials obtainable and our workmanship is fully guaranteed.

We carry cork-board, granulated and re-granulated cork, also cork pipe covering in stock.



## ACCESSORIES AND SUPPLIES

Agitators	Can Dogs	Oil Pumps
Ammonia	Dip Tanks	Pipe Bending
Ammonia Accumulators	Drip Pans	Paint for Ice Cans
Air Blowers	Distilled Water Coolers	Packing
Air Compressors	Forecooling Storage Tanks	Pitch Asphaltum
Brine Coolers	Gauges	Pumps
Belts	Hoists, Air and Hand	Receivers
Coils	Hose and Hose Dollies	Reboiling Tanks
Condensers, Atmospheric and D. P.	Ice Cans	Separators, Oil
Calcium Chloride	Ice Tanks	Scale Traps
Cork Insulation	Ice Conveyors	Steam Condensers
Clocks	Ice Recording Doors	Skimming Tanks
Centrifugal Pumps	Ice Conveying Elevators	Tanks, Blank or Galvanized
Can Fillers	Insulating Paper	Thermometers
Can Dumps	Motors	Truck Hoists
C. S. Doors	Oil Separators	
	Oil, Zero Test	

We manufacture a complete stock of Ammonia Valves, Tees, Ells, Flanges and all necessary fittings to make up a complete refrigerating and ice making system.

We manufacture low pressure air blowing systems complete for making clear raw water ice.





